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(54) **An ink cartridge for a printer**

Tintenkassette für Drucker

Cartouche d'encre pour imprimante

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(56) References cited:  
**EP-A- 0 418 828 EP-A- 0 576 237**  
**EP-A- 0 598 481 EP-A- 0 638 426**  
**EP-A- 0 685 340 EP-A- 0 792 749**  
**GB-A- 2 293 141**

• **PATENT ABSTRACTS OF JAPAN vol. 018, no.**  
**083 (M-1558), 10 February 1994 & JP 05 293970**  
**A (DAINIPPON INK & CHEM INC), 9 November**  
**1993,**

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## Description

### Background of the Invention

[0001] The subject invention is directed toward the art of ink jet printers and, more particularly, to an improved ink storage cartridge for such printers.

[0002] Cartridges for a print head of an ink jet printer which contain a porous ink storage body have an opening in a cover for admitting air. For reducing evaporation losses, it has been proposed to provide the inner surface of the cover with a long capillary groove. One end of the groove ends in a fill opening, and the other end communicates with a vent hole through the cover. The groove is covered by a foil. On the outside surface of the cover, a label is sealed over the fill opening. For shipment, the vent hole is sealed by an adhesive tape.

[0003] GB-A-2 293 141 discloses an ink cartridge provided with a foil seal that is made up of two portions connected by a neck portion. When one of the portions is removed from the cartridge it is separated from the remaining portion at the neck portion.

### Summary of the Invention

[0004] The object of the present invention is to simplify the manufacturing of a cartridge of the type described.

[0005] According to the present invention, the cartridge comprises a casing having a cover with a vent opening for admitting air into the interior of the casing. The outer face of the cover has a capillary groove with a first portion of the groove having a first end communicating with the opening and a second end communicating with an S-shaped second portion of the groove. The second portion includes three transverse branches and two connecting branches. The second portion ends at a location spaced from an edge of the cover. The outer face of the cover is covered by a sealed-on foil which overlaps one edge of the cover adjacent the second portion of the groove. Two cuts in the foil extend from opposed edges of the foil into areas between each of the transverse branches.

[0006] For shipment, the vent opening is completely sealed. Before or after insertion of the cartridge into the print head, the area of the foil with the overlapping edge is torn off. The foil then tears through from the end of the first cut towards the second cut and is peeled off. The S-shaped portion now communicates with the atmosphere.

[0007] Still other advantages and benefits of the invention will become apparent to those skilled in the art upon a reading and understanding of the following detailed description.

### Brief Description of the Drawings

[0008] The invention may take physical form in certain parts and arrangements of parts, a preferred embodi-

ment and method of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof, and wherein:

FIGURE 1 shows a top view on the cover of the cartridge according to the invention; and, FIGURE 2 is a partial cross section through the cartridge.

### Detailed Description of the Preferred Embodiment

[0009] Referring now to the drawings wherein the showings are for the purposes of illustrating the preferred embodiment of the invention only and not for purposes of limiting same, the cartridge 1 of the preferred embodiment shown in FIGURES 1 and 2 comprises a casing 2 with lateral walls 4 on the free ends of which a cover 5 is sealed, such as by being welded thereto. The cartridge contains a porous body 12, e.g., of foamed synthetic material such as polyethylene. The cover has a recessed opening 13 for filling the body 12 with ink before shipment and for admitting air to a recessed space 14 of the body 12 during use of the cartridge in a print head of an ink jet printer. The recess 25 of the opening 13 is used to center and seal a filling tube for supplying the ink.

[0010] A narrow capillary is formed in the outer face 27 of the cover 5. The capillary groove has a first portion 26 with a first end 28 that extends into the recess 25 and is thereby connected to the opening 13. The other end 29 is connected to a second portion that comprises an S-shaped narrow capillary channel 30 with three transverse branches 31, 32, 33 parallel to the transverse edges 34 of the cover, and two connecting branches 35, 36 which are perpendicular to the transverse branches 31-34. The channel 30 ends at a location spaced from the edge 34. Preferably, the first portion 26 of the capillary groove has a meandering or zig-zag form.

[0011] A foil 42 is sealed onto the outer face 27 of the cover 5. The foil 42 may be of aluminum coated with a thermoplastic for heat sealing or it may be a laminated or unlaminated thermoplastic foil. Alternatively, an adhesive tape may be used. The foil could also be coated with a hot melt adhesive. An end area 43 of the foil 42 overlaps the transverse edge 34 of the cover 5 adjacent the channel. Two transverse cuts 44, 45 are cut through the foil 42 starting from opposed longitudinal edges 46, 47 of the foil 42 and ending in the region between each two adjacent transverse branches 31, 32 and 32, 33. The area of the foil 42 to the left of the cut 45 in FIGURE 1 is printed as a label for the cartridge. The area to the right of the cut 45 is torn off before use of the cartridge 1 in a printer. To this end, the foil 42 is grabbed at the overlapping area 43 and peeled off the cover 5 until the cut 44 is reached. Then the foil 42 is torn through starting from the inner end of cut 44. Since the cuts 44, 45 overlap by a substantial amount in their longitudinal direction, the tear line 48 which may be at an arbitrary angle

to the longitudinal edges (indicated with dotted lines in FIGURE 1) will automatically end at the cut 45. Thus, the branch 32 of the channel 30 is open to the atmosphere. The remaining foil 42 to the left of cuts 44, 45 remains as a label on the cover 5 and as an outside seal for the capillary groove and part of the channel 30. In case the user tears the area 43 sideways, the tear line 48 crosses one of the branches 35 or 31.

[0012] The same opening 13 is used for ink filling during production and for air admittance during use. A single foil is used as a label, as a seal for the fill opening, as a cover for the capillary groove, and as a hermetic seal for shipment. Therefore, an economic manufacturing of the cartridge is achieved. Because of the two overlapping cuts 44, 45, the foil 42 can be torn off in the length direction of the cover 5. Therefore, no overlap over the longitudinal edge 46 is required to the right of cut 44. This enables an inexpensive production of the labels from a continuous band.

#### Claims

##### 1. An ink cartridge for a printer comprising:

a casing (2) for containing ink;  
a cover (5) on said casing, said cover having an outer face and a peripheral edge, an opening (13) through said outer face for admitting air into the interior of the casing, the outer face having a capillary groove including a first portion (26) with a first end communicating with the opening and a second end communicating with a second portion (30) having an S-shape with three transverse branches (31, 32, 33) and two connecting branches (35, 36), the second portion ending spaced from the peripheral edge of the cover; and,  
a foil seal (42) on the outer face of the cover to overlie the capillary groove, the foil seal overlapping a portion of the peripheral edge of the cover adjacent the second portion of the capillary groove, two cuts (44, 45) through the foil seal extending from opposed edges of the foil into areas between two of the transverse branches.

2. The cartridge of claim 1 wherein the three transverse branches of the S-shaped portion of the capillary groove are substantially parallel to one another and to said two cuts through the foil.

3. The cartridge of claim 1 wherein the first portion of the capillary groove is meander shaped.

4. The cartridge of claim 1 wherein the foil is aluminum coated with a thermoplastic.

5. The cartridge of claim 1 wherein the foil is a thermoplastic foil.

6. The cartridge of claim 1 wherein the foil is rectangular in plan view and overlaps a portion of the peripheral edge of the cover that extends generally in the direction of the three transverse branches of the second portion of the capillary groove.

#### Patentansprüche

##### 1. Tintenkassette für einen Drucker mit

einem Behälter (2) zur Aufnahme von Tinte, einem Deckel (5) auf diesem Behälter, wobei dieser Deckel eine äussere Fläche und einen peripheren Rand und eine Öffnung (13) durch diese äussere Fläche aufweist, um Luft in das Innere des Behälters einzulassen, wobei die äussere Fläche eine kapillare Vertiefung aufweist, welche einen ersten Bereich (26) mit einem ersten Ende aufweist, welches mit der ersten Öffnung in Verbindung steht und mit einem zweiten Ende, welches mit einem zweiten Bereich (30) in Verbindung steht, wobei der zweite Bereich eine s-Form aufweist mit drei querlaufenden Zweigen (31, 32, 33) und zwei verbindenden Zweigen (35, 36) und wobei der zweite Bereich beabstandet zum peripheren Rand des Deckels endet, und mit einem Foliensiegel (42) auf der äusseren Fläche des Deckels zur Überdeckung der kapillaren Vertiefung, wobei das Foliensiegel einen dem zweiten Bereich der kapillaren Vertiefung benachbarten Bereich des peripheren Randes des Deckels überdeckt und wobei sich zwei Schnitte (44, 45) durch das Foliensiegel von entgegengesetzten Rändern der Folie in Gebiete zwischen zwei der querlaufenden Zweige erstrecken.

2. Tintenkassette nach Anspruch 1, wobei die drei querlaufenden Zweige des s-förmigen Bereiches der kapillaren Vertiefung im wesentlichen parallel zueinander und zu den zwei Schnitten in der Folie verlaufen.

3. Tintenkassette nach Anspruch 1, wobei der erste Bereich der kapillaren Vertiefung meanderförmig ist.

4. Tintenkassette nach Anspruch 1, wobei die Folie mit einem Thermoplast aluminiumbeschichtet ist.

5. Tintenkassette nach Anspruch 1, wobei die Folie eine thermoplastische Folie ist.

6. Tintenkasette nach Anspruch 1, wobei die Folie in der Draufsicht rechteckförmig ist und einen Bereich des peripheren Randes des Deckels überlappt, der sich generell in die Richtung der drei querlaufenden Zweige des zweiten Bereiches der kapillaren Vertiefung erstreckt. 5

vauche une portion du bord périphérique du couvercle qui s'étend sensiblement dans la direction des trois branches transversales de la deuxième partie de la rainure capillaire.

## Revendications

1. Cartouche d'encre pour une imprimante, comprenant :

un boîtier (2) pour contenir de l'encre ;  
 un couvercle (5) placé sur le dit boîtier, le dit couvercle ayant une face extérieure et un bord périphérique, un orifice (13) traversant la dite face extérieure pour admettre de l'air dans l'intérieur du boîtier, la face extérieure présentant une rainure capillaire qui inclut une première partie (26) dont une première extrémité communique avec l'orifice et une deuxième extrémité communique avec une deuxième partie (30) en forme de S avec trois branches transversales (31, 32, 33) et deux branches de liaison (35, 36), la deuxième partie se terminant à distance du bord périphérique du couvercle ;  
 et  
 une feuille mince de fermeture (42) placée sur la face extérieure du couvercle de manière à recouvrir la rainure capillaire, la feuille de fermeture chevauchant une portion du bord périphérique du couvercle adjacente à la deuxième partie de la rainure capillaire, deux coupures (44, 45) formées à travers la feuille de fermeture s'étendant à partir des bords opposés de la feuille dans des régions situées entre deux des branches transversales. 15  
 20  
 25  
 30  
 35

2. Cartouche selon la revendication 1, dans laquelle les trois branches transversales de la partie en forme de S de la rainure capillaire sont sensiblement parallèles les unes aux autres et aux dites coupures à travers la feuille. 40

3. Cartouche selon la revendication 1, dans laquelle la première partie de la rainure capillaire est en forme de méandres. 45

4. Cartouche selon la revendication 1, dans laquelle la feuille est en aluminium revêtu d'une matière thermoplastique. 50

5. Cartouche selon la revendication 1, dans laquelle la feuille est une feuille de matière thermoplastique. 55

6. Cartouche selon la revendication 1, dans laquelle la feuille est rectangulaire en vue en plan et che-

Fig. 1

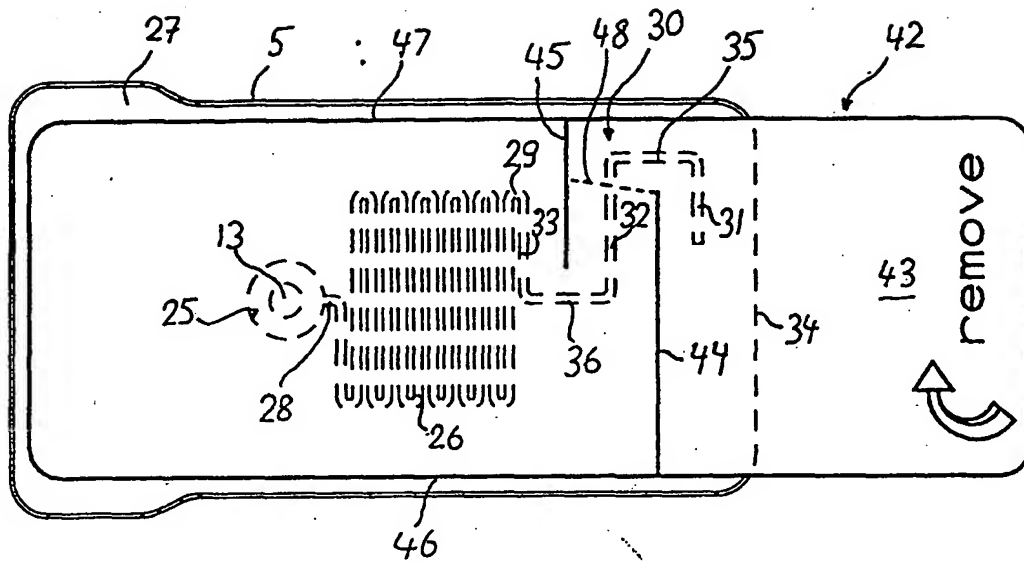
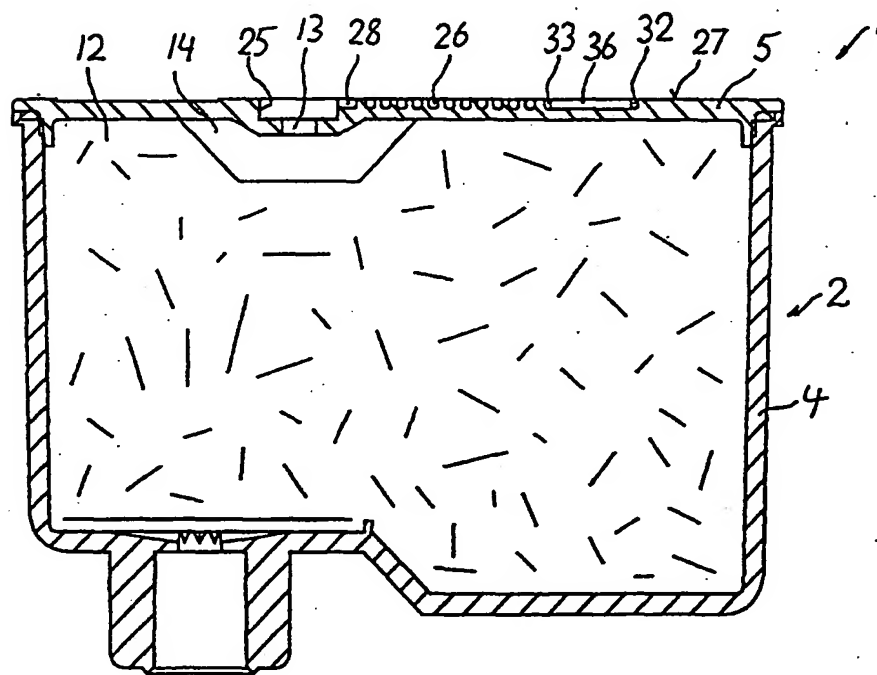


Fig. 2



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